Net-Ready Key Performance Parameter Testing

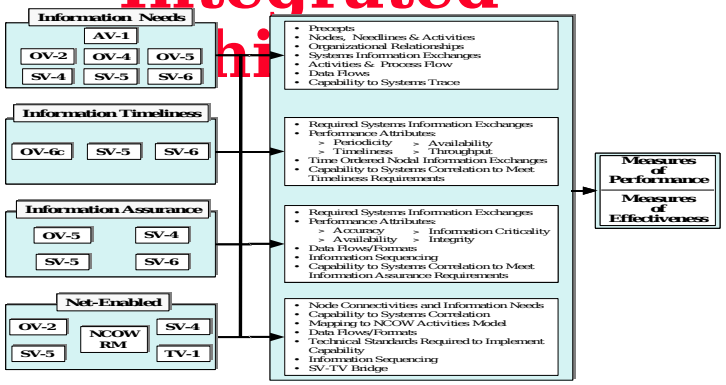
LTC Tom Gaetjen

J6

Net-Ready KPP

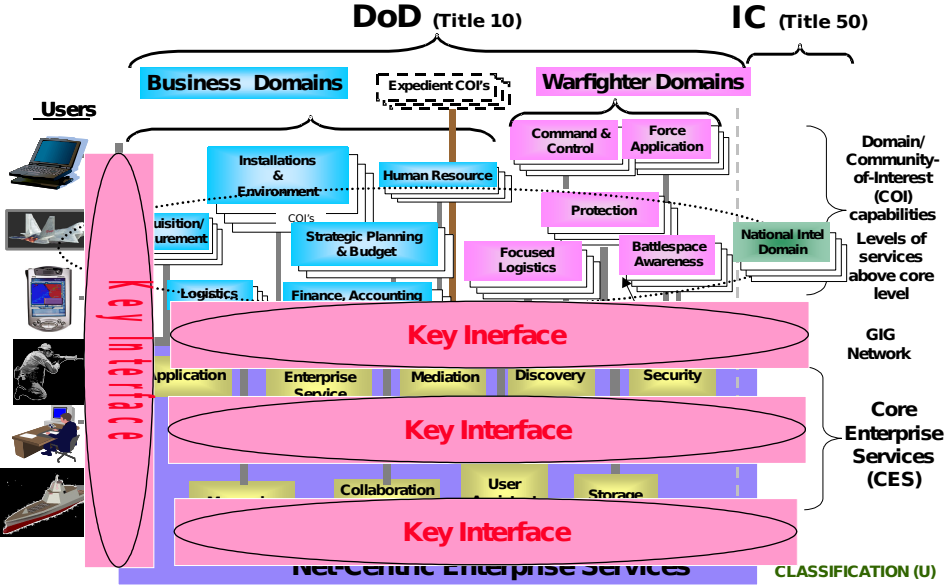
NCOW RM Compliance

Integrated

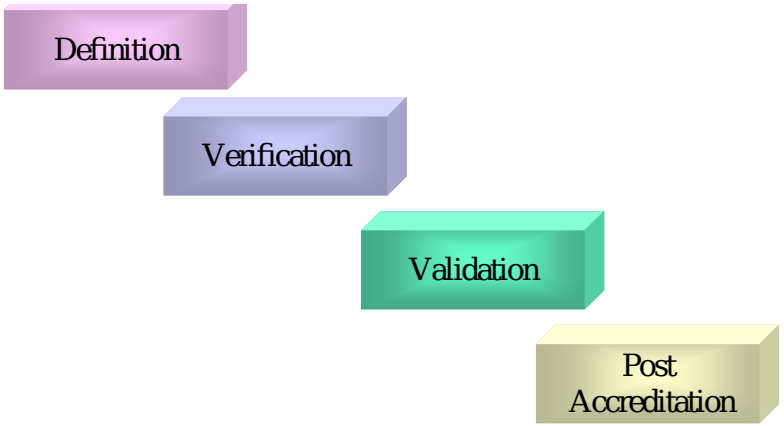


KIP Compliance

GIG Enterprise Services Vision

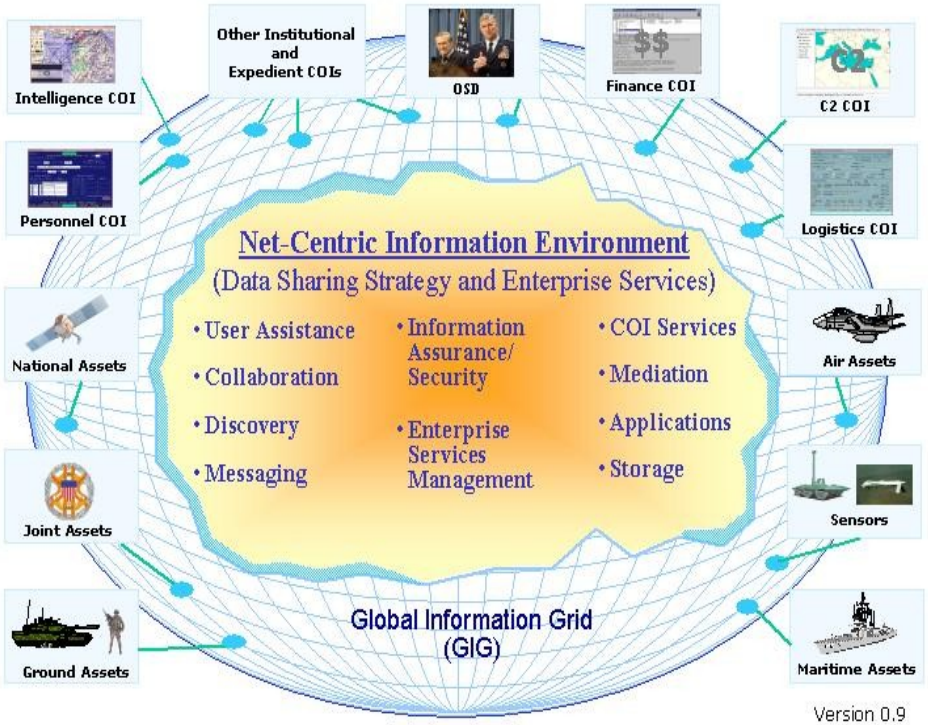


Information Assurance (DITSCAP*)



*DoD Information Technology Security Certification and Accreditation Process

(NCOW) Reference Model



- **Provides a common language and understanding of net-centricity**
- **Specifies the core capabilities of a net-centric DoD architecture**
- **Provides basic templates and guidance for building net-centric DoD architectures**
- **Specifies compliance criteria for measuring and analyzing net-centricity in a DoD architecture.**

NCOW RM Conformance and Compliance

All DoD architectures are expected to comply and conform to the NCOW RM by:

- Using common NCOW RM definitions and vocabulary
- Incorporating the capabilities and services described in the NCOW RM
- Incorporating the IT/NSS standards identified in the NCOW RM

This supports Compliance and conformance with the GIG translates to satisfying the requirements of the following five products:

- DoD Architecture Framework (DoDAF)
- Net-Centric Operations and Warfare Reference Model (NCOW RM).
- Joint Technical Architecture (JTA) and the NCOW RM.
- Core Architecture Data Model (CADM).
- GIG Enterprise Services (GIG ES) Capability Description Document (CDD)

Integrated Architecture Products

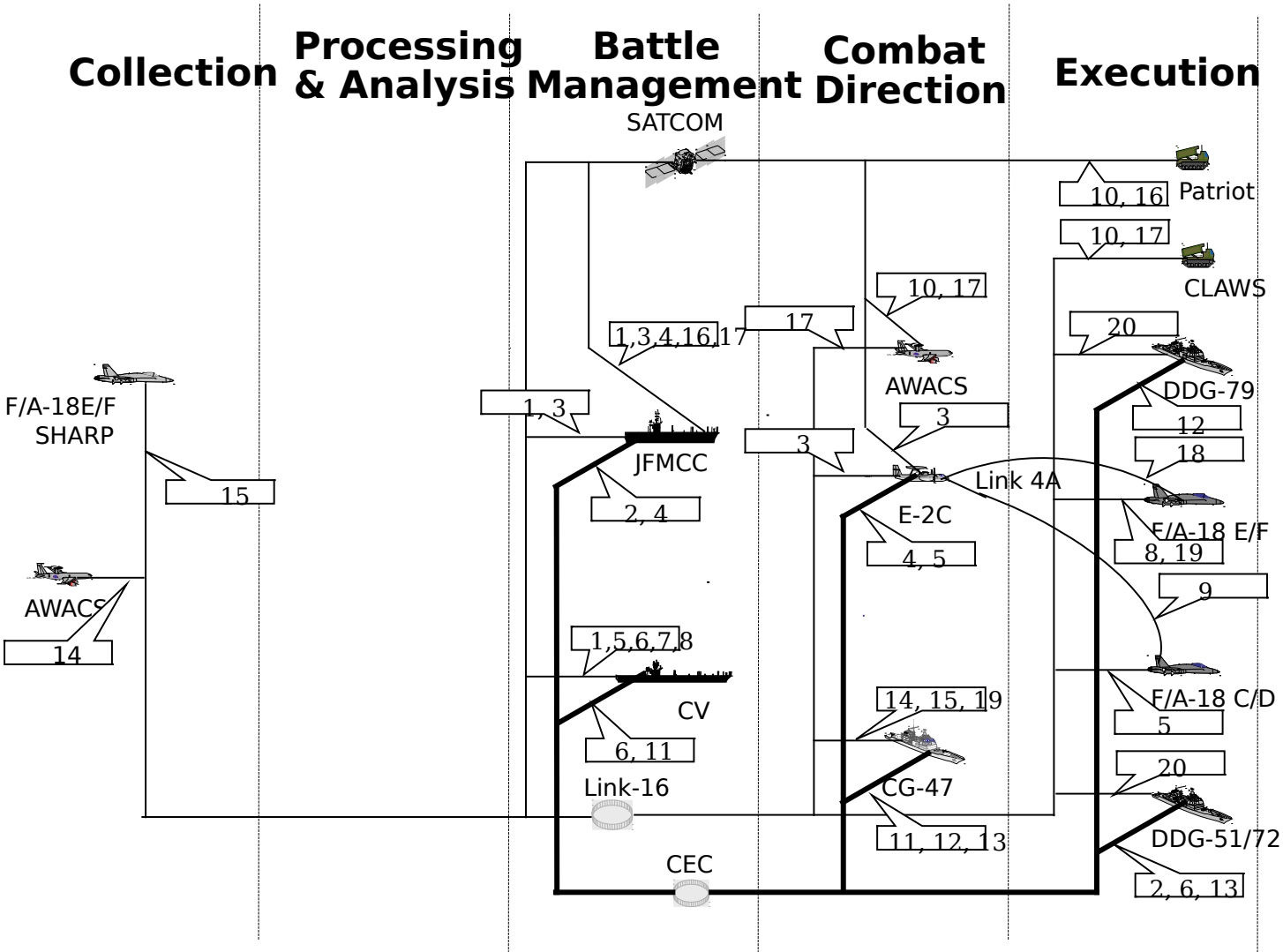
Framework Products	Framework Product Name	General Description
AV-1	Overview and Summary Information	Scope, purpose, intended users, environment depicted, analytical findings
OV-2	Operational Node Connectivity Description	Operational Nodes, operational activities performed at each node, connectivity and information exchange needlines between nodes
OV-4	Organizational Relationships Chart	Organizational, role, or other relationships among organizations
OV-5	Operational Activity Model	Operational activities, relationships among activities, inputs and outputs. Overlays can show cost performing nodes, or other pertinent information.
OV-6c	Operational Event-Trace Description	One of three products used to describe operational activity sequence and timing – traces actions in a scenario or sequence of events and specifies timing of events
SV-4	Systems Functionality Description	Functions performed by systems and the information flow among system functions
SV-5	Operational Activity to Systems Function Traceability Matrix	Mapping of systems back to operational capabilities or of system functions back to operational activities.
SV-6	Systems Data Exchange Matrix	Provides details of systems data being exchanged between systems.
TV-1	Technical Standards Profile	Extraction of standards that apply to the given architecture.

Architecture Analysis

Focus on Architecture and Standards.

- **First order analysis - identifying capability gaps, shortfalls and duplications.**
- **Second order analysis - identifies interoperability requirements.**

The Systems "SV-1: 2003 Strike Mission Node Connectivity Diagram"



Note: Notional architecture for instructional purposes

Operational Activity to Systems Function Traceability Matrix (SV-5)

System Functions	Operational Activities															
	3.11	3.11.3	3.12	3.12.1	3.12.2	3.12.3	3.13	3.14	3.14.1	3.14.2	3.14.3	3.14.4	3.15	3.16	3.17	3.17.1
1	X															
1.1		X														
1.1.1			X													
1.1.1.1	X															
1.1.1.2					X											
1.1.1.3							X									
1.1.2										X						
1.1.2.1				X												
1.1.2.2						X										
1.1.2.3								X								
1.1.3											X					
1.1.3.1													X			
1.1.3.2									X							
1.1.3.3														X		
1.1.3.4														X		

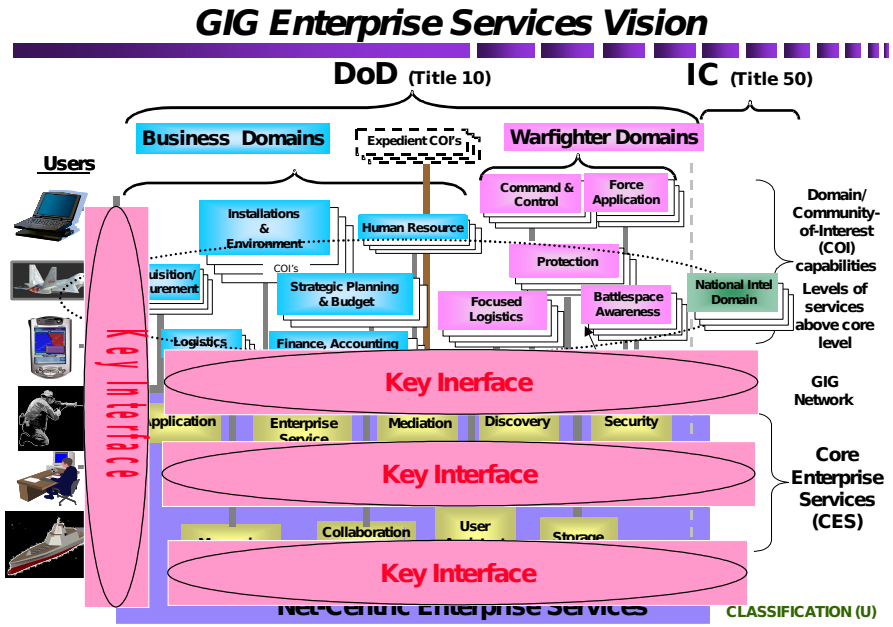
The Systems "Systems Data Exchange Matrix (SV-6)"

SV-6: 2003 Strike Mission (Illustrative Data)

IER No.	Sender	Receiver	Content	Media	Info Char	Format	Security	Freq	Timeliness	Thru put
1	JFMCC	CVIC	Target ID	JTIDS/SAT	Data	J 3.90	KGV-8	N/A	30 sec	N/A
2	DDG-51	JFMCC	Track Init.	DDS	Sensor	CEC data	KY-?	N/A	1 sec	N/A
3	JFMCC	E-2C	Engage Order	JTIDS/SAT	Data	J 13.85	KGV-8	N/A	15 sec	N/A
4	E-2C	JFMCC	Track Update	DDS	Sensor	CEC data	KY-?	N/A	7ms	N/A
5	CVIC	F/A-18	Engage Order	JTIDS	Data	J 13.85	KGV-8	N/A	10ms	N/A
6	DDG-51	CVIC	Target Loc	DDS	Sensor	CEC data	KY-?	N/A	4 sec	N/A
7	Patriot	CVIC	Target Acq	JTIDS	Data	J 4.56	KGV-8	N/A	2 min	N/A
8	F/A-18CD	CVIC	Target Killed	JTIDS	Data	J 8.76	KGV-8	N/A	3 min	N/A
9	E-2C	CVIC	CAP Posit	JTIDS	Data	J 10.74	KGV-8	N/A	35 sec	N/A
10	Patriot	AWACS	Target Loc	JTIDS/SAT	Data	J 12.101	KGV-8	N/A	4 Sec	N/A
11	CG-47	CVIC	Target Loc	DDS	Sensor	J 12.101	KY-?	N/A	2 sec	N/A
12	CG-47	DDG-81	Target ID	DDS	Sensor	CEC data	KY-?	N/A	1 sec	N/A
13	DDG-51	CG-47	Posit Info	DDS	Sensor	CEC data	KY-?	N/A	500 ms	N/A
14	CG-47	AWACS	Cse Orders	JTIDS	Data	J 7.99	KGV-8	N/A	2 min	N/A
15	CG-47	SHARPS	Cse Orders	JTIDS	Data	J 7.99	KGV-8	N/A	2 min	N/A
16	Patriot	JFMCC	Target Loc	JTIDS/SAT	Data	J 12.101	KGV-8	N/A	4 min	N/A
17	Hawk	JFMCC	Target Loc	JTIDS/SAT	Data	J 12.101	KGV-8	N/A	4 min	N/A
18	E-2C	F/A-18EF	Cse Orders	JTIDS	Data	FDL	KGV-8	N/A	30 sec	N/A
19	F/A-18EF	CG-47	Target ID	JTIDS	Data	J 3.90	KGV-8	N/A	30 sec	N/A
20	DDG-81	DDG-51	Target ID	JTIDS	Data	J 3.90	KGV-8	N/A	30 sec	N/A

Note: Notional architecture for instructional purposes

Key Interface



- **Organizational boundaries.**
- **Mission critical.**
- **Difficult or complex to manage.**
- **Capability, interoperability. or efficiency issues.**
- **Impacts multiple acquisition programs.**
- **Vulnerable**

The 17 Key Interfaces

Communications KIPs

- Logical Networks to DISN Transport Backbone
- Space to Terrestrial Interface
- JTF to Coalition
- JTF Component to JTF Headquarters
- Teleport (i.e., deployed interface to DISN)
- Joint Interconnection Service
- DISN Service Delivery Node
- Secure Enclave Service Delivery Node (e.g., SCI/Collateral KIP)

Computing KIPs

- Application Server to Database Server
- Client to Server
- Applications to COE/CCP

Network Operations KIPs

- End System to PKI
- Management Systems to (integrated) Management Systems
- Management Systems to Managed Systems
- IDM to Distribution Infrastructure
- Information Servers to IDM Infrastructure

Applications

- Application Server to Shared Data (e.g., Situational Awareness Data KIP)

(Pilot Projects in Red)

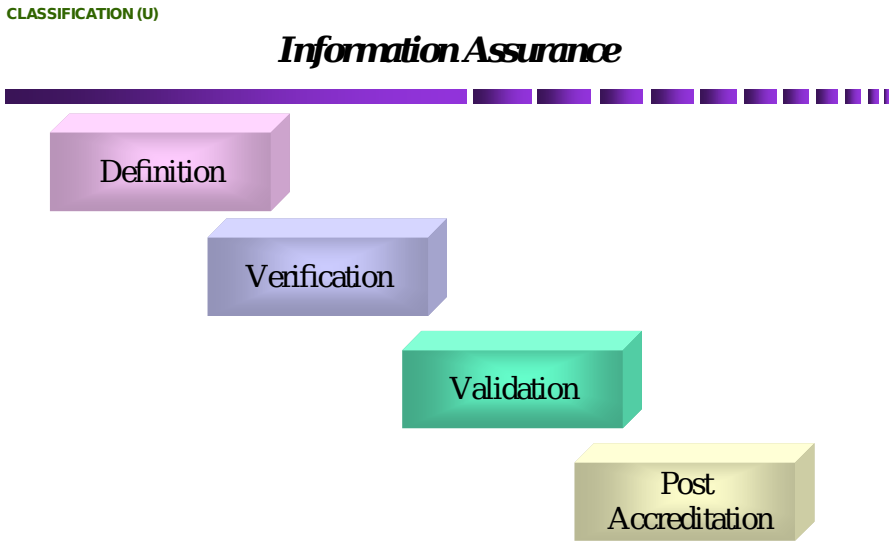
KIP Analysis

- **Logical Networks to DISN Transport Backbone.** Does your network connect to DISN Backbone?
- **Space to Terrestrial.** Does your ground terminal utilize or require access to DOD SATCOM programs such as DSCS, MILSTAR, FLTSAT, UFO, MUOS, Polar EHF, GPS, GBS, INMARSAT, Wideband Gapfiller, etc?
- **STEP and TELEPORT.** Does your ground terminal interface with/connect with STEP/TELEPORT systems?
- **JTF to Coalition.** Does your program or system interface with/connect the JTF to coalition forces?
- **JTF Component to JTF Headquarters.** Does your program or system interface/connect the JTF Component to the JTF Headquarters?
- **Joint Interconnection Service.** Does your organization connect the NIPRNET to Internet?
- **DISN Service Delivery Point.** Does your base, camp, post, station, unit or organization connect to the DISN?
- **Secure Enclave Service Delivery Point.** Does your system or program interface with or connect a Secure Enclave local area network to DISN service delivery point?
- **Client to Server.** Does your workstation publish, utilize or require access to data residing in DOD/NCES/GES servers?
- **End System to PKI.** Do your workstation and applications utilize or interface with utilize DOD **PKI?**
- **Information Servers to IDM Infrastructure.** Does your information server (collaboration, discovery, mediation, security, application, messaging, etc) require access to NCES/GES Infrastructure?
- **IDM to Distribution Infrastructure.** Does your network management system and communications system requires access to NCES/GES?
- **Management Systems to Managed Systems.** Does your system for personal and local computing manage the local network infrastructure (routers, WAPs, switches, hubs, firewalls, gateways, IDS), servers, and terminal devices (desktop computers, printers, wireless terminals?
- **Management Systems to (Integrated) Managed Systems.** Does your management system interface with DOD GNOSC, RNOSC? Includes NIPRNET NOC, GSSC, SIPRNET NOC, DSN NOC, DRSN NOC?
- **Applications Server to Database Server.** Does your web or application server require access to NCES/GES database server(s)?
- **Applications to Shared Data.** Does your application require access to shared data residing in NCES/GES infrastructure?
- **Application to COE/NCES/GES.** Does your application require access to COE/NCES/GES services?

KIP Compliance

- **Analysis required by PM to determine applicable KIPs**
- **Implemented IAW profile**
- **Validated during testing**

Information Assurance (DITSCAP)*

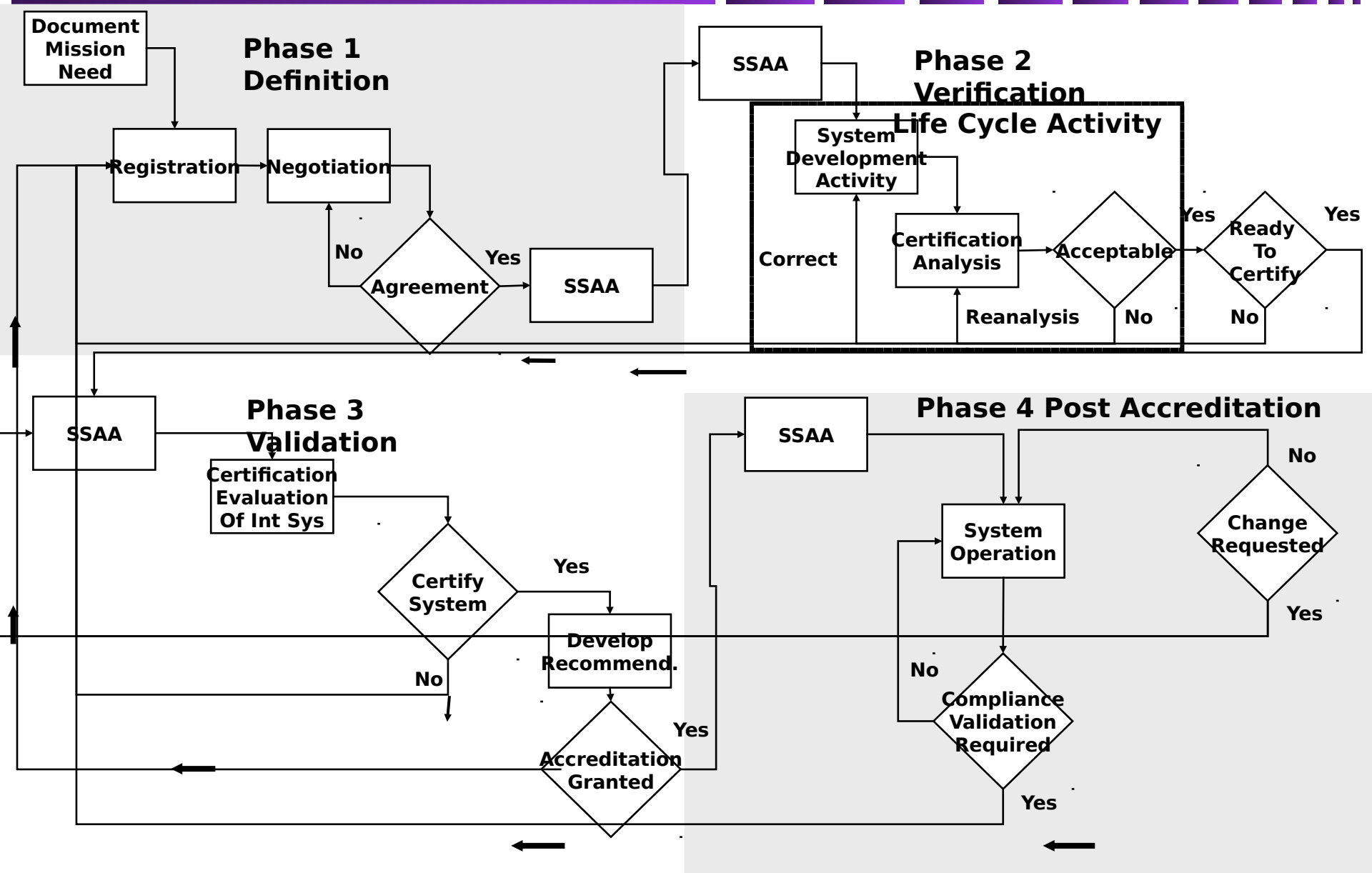


- **Availability**
- **Integrity**
- **Authentication**
- **Confidentiality**
- **Non-repudiation**

INFORMATION ASSURANCE (IA): **Information Operations that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation.**

*DoD Information Technology Security Certification and Accreditation Process

Certification and Accreditation Process (DITSCAP)



NR-KPP View of Interoperability

NEW	OLD
• NCOW Reference Model	• N/A
• Key Interface Profiles (KIPs) – Standard ways for DoD to interface	• (Key) Interfaces – Defined on a system-by-system basis
• Integrated Architectures – Defines info exchange in context of COIs	• Information Exchange – Propensity to define info flow from system-centric view
• Information Assurance	• Information Assurance

Potential NR-KPP Impacts: General

- More standardization in information collection, transmittal, processing, storage . . .
- Fewer unique processes
- Fewer unique systems
- Reduced impact of “N-squared” issue
- Increased importance of standards
- Increased importance of integrated architectures
- Increased potential for “flexible interoperability”

Potential NR-KPP Impacts: Testing

- Increases emphasis on standards conformance testing
- Allows for net-centric testbed infrastructure
- Facilitates standardization of test methodologies
- Facilitates developing strong subject matter expertise
- Helps frame operational impacts (integrated architectures)

Element Definition and Testing

NR-KPP Element	Status	T&E Issues	Resource Impact	Test Method
NCOW RM	Training available for comform. and compl.	Testing infrastructure required.	PM training and compliance NII	TBD; Mix of stds compliance and interfaces to network.
KIPs	17 ID'd; 2 Developed 2 Candidate ICDs	Definition of additional KIPs; ID/Development of test capabilities.	PM OT JITC	Primarily stds compliance with pt-to-pt checks.
Integrated Architectures	Operational Concept ArchiteturesImmature	Key to capabilities definition and testing – but have been elusive; N-squared potential.	Sys Developers PM JS FCB	End-to-End testing via distributed testbeds, operational tests, and exercises.
Information Assurance	Process Defined	Could range from DITSCAP to operational evals.	PM AA USERS	DITSCAP straight fwd; op evals require metrics & constant updating.

KPP Testing/ Metrics

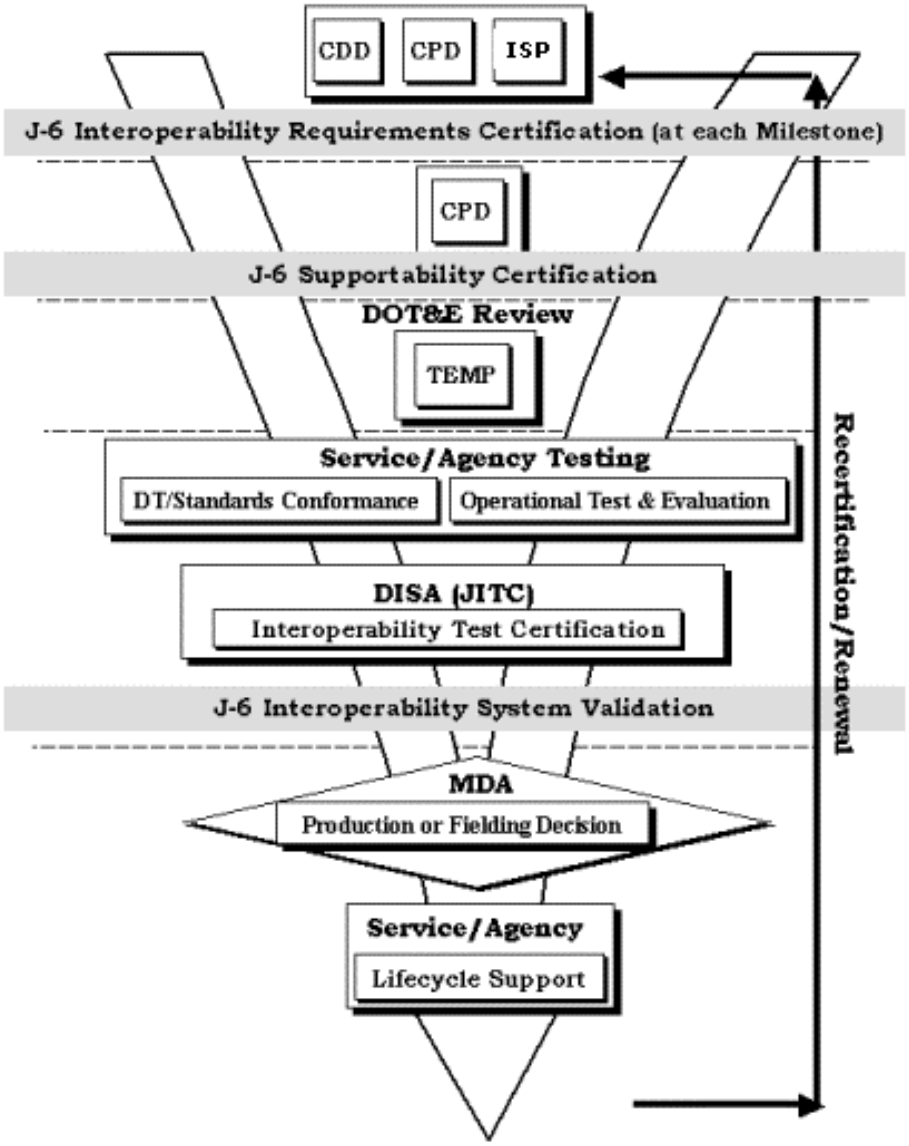
Attributes

- **Information needs**
- **Information timeliness**
- **Information assurance**
- **Net-enabled**

Metrics

- **Core Elements**
  - **Information Processing**
  - **Information Transfer**
  - **Information Modeling, Metadata, and Information Exchange**
  - **Human-Computer Interface**
  - **Information Security/Assurance**
- **Community of Interest (COI) Elements**
  - **Content, Accuracy, Timeliness, Relevance**

Testing


CDD
CPD
ISP
J-6 Interoperability Requirements Certification (at each Milestone)
CPD
J-6 Supportability Certification
DOT&E Review
TEMP
Service/Agency Testing
DT/Standards Conformance
Operational Test & Evaluation
DISA (JITC)
Interoperability Test Certification
J-6 Interoperability System Validation
MDA
Production or Fielding Decision
Service/Agency
Lifecycle Support
Recertification/Renewal

Testing

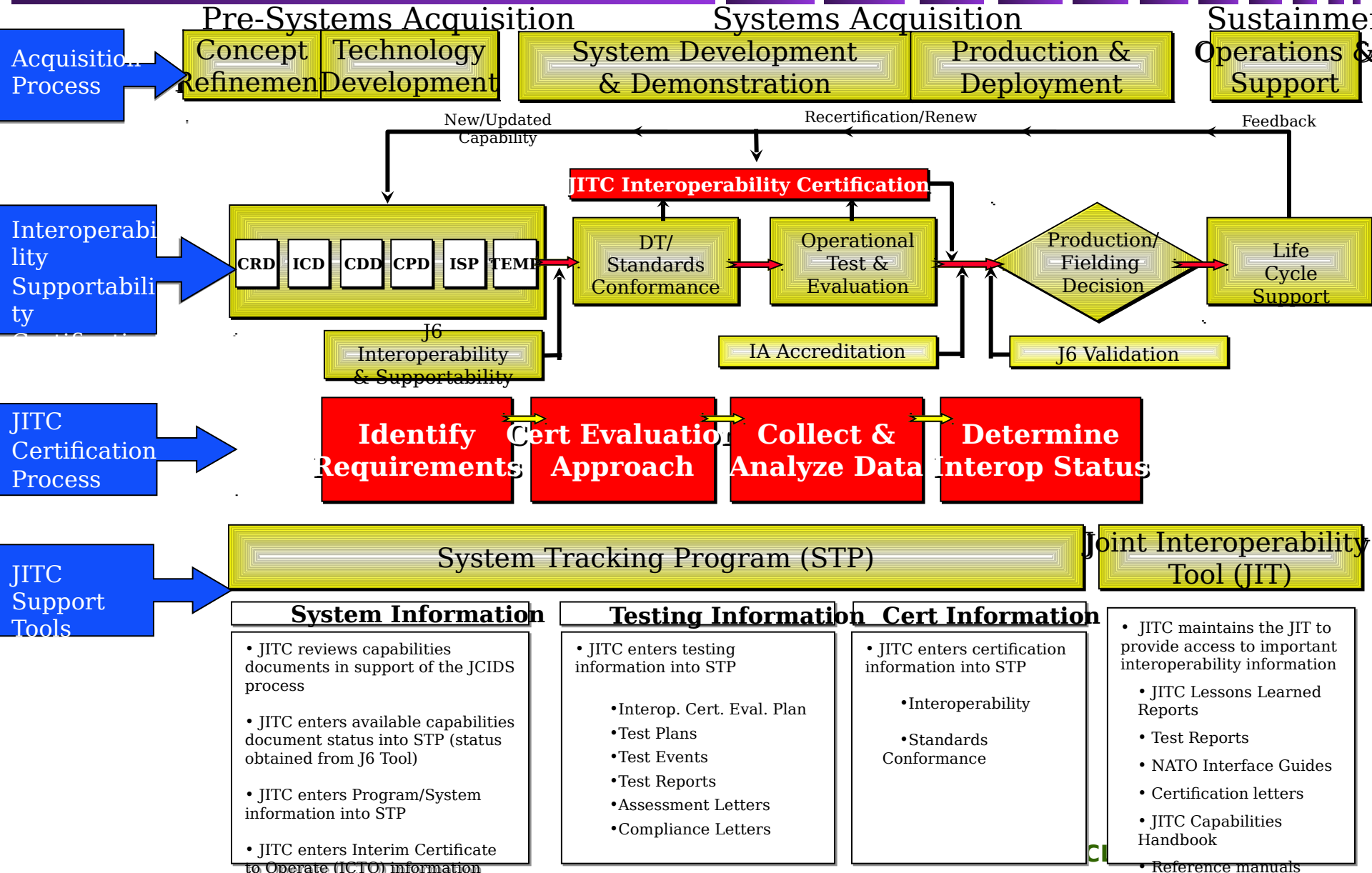
- Attributes
  - Information needs
  - Information timeliness
  - Information assurance
  - Net-enabled
- Metrics
  - Core Elements
    - Information Processing
    - Information Transfer
    - Information Modeling, Metadata, and Information Exchange
    - Human-Computer Interface
    - Information Security/Assurance
- Community of Interest (COI) Elements
  - Content, Accuracy, Timeliness, Relevance

OPERATIONAL TESTING

- Capability Certification
- DT / Standards Conformance, OT&E, and Interoperability Certification
- Operational Verification

JITC INTEROPERABILITY TESTING

JITC Certification Process



System Information

- JITC reviews capabilities documents in support of the JCIDS process
- JITC enters available capabilities document status into STP (status obtained from J6 Tool)
- JITC enters Program/System information into STP
- JITC enters Interim Certificate to Operate (ICTO) information

Testing Information

- JITC enters testing information into STP
  - Interop. Cert. Eval. Plan
  - Test Plans
  - Test Events
  - Test Reports
  - Assessment Letters
  - Compliance Letters

Cert Information

- JITC enters certification information into STP
  - Interoperability
  - Standards Conformance

- JITC maintains the JIT to provide access to important interoperability information
  - JITC Lessons Learned Reports
  - Test Reports
  - NATO Interface Guides
  - Certification letters
  - JITC Capabilities Handbook
  - Reference manuals

Conclusions

- **Net Centricity can help transform interoperability within DoD; NR-KPP is a first step.**
- **Testing dependent on further NR-KPP definition and application to specific case studies.**
- **Standards conformance/compliance testing increasingly important, but end-to-end testing within integrated architectures still a must.**
- **Interoperability will remain a complex and evolving entity – can't achieve it "once and for**

Conclusions

- GIG Enterprise Services
  - Compliance
  - Conformance
- Key Interface
  - Compliance
  - Conformance
- JTA
  - Compliance
  - Conformance
- Information Assurance
- Cost $$

- No Change from current
- No Change from current
- No Change from current
- No Change from current
- No Change from current

Conclusions - What is missing?

NRKPP:

- **GIG Enterprise Services**
- **Key Interface**

- **Cost $$**

Example of what is needed:

MISSING:

- **Generic Interoperability Requirement Repository (GIRR) (Virtual)**
  - **Includes DISR(JTA), KIPs, etc**
  - **Repository of certified 'test cases" systems**

- **Unknown – NCES pilot**
- **JSF pilot**

GSCR "Generic Switch Center Requirements" for voice/circuit switches

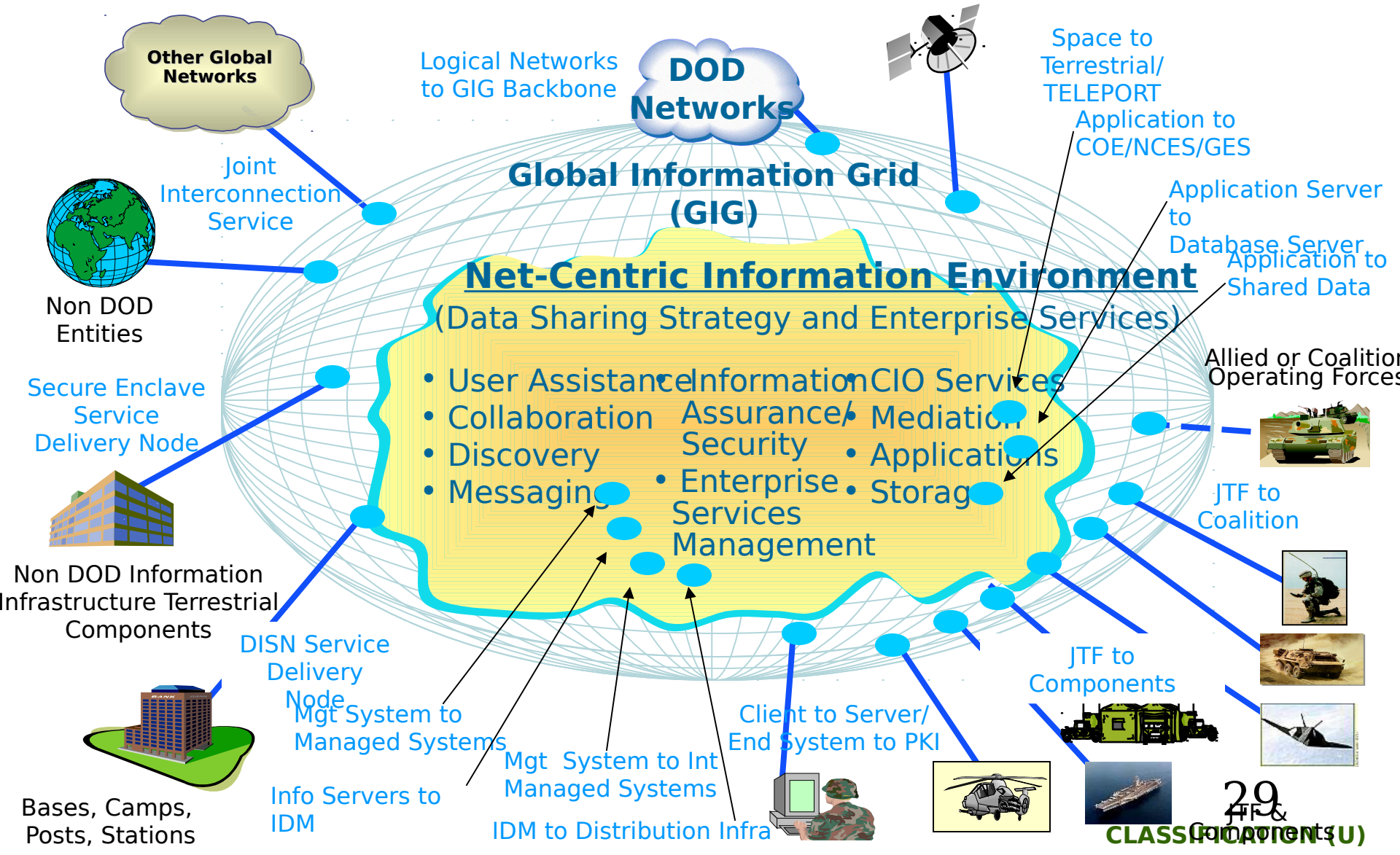
- **GSCR developed over many years, and provides established measurable testable standards.**

Backups

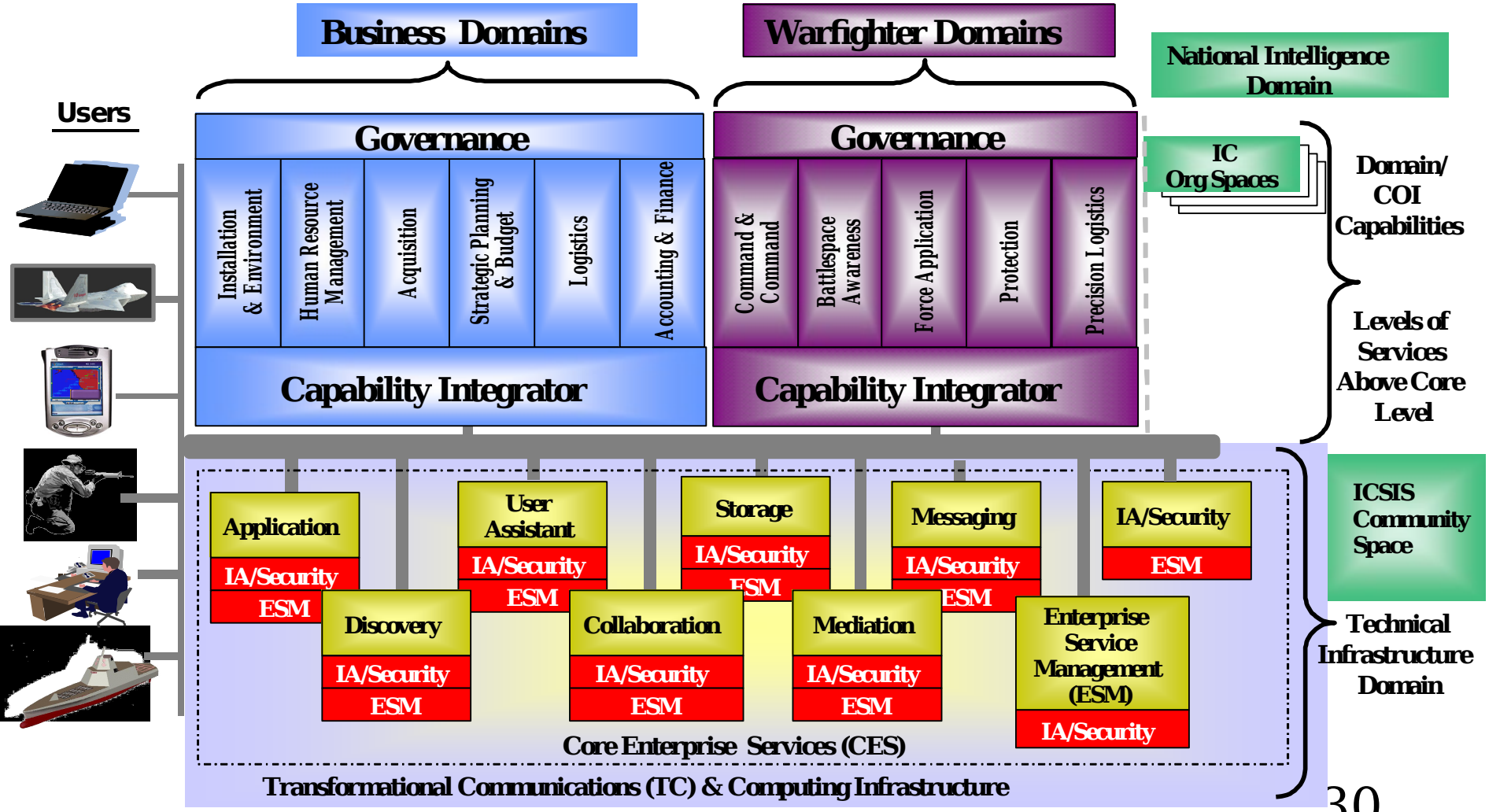
TEST WHAT?

To the GIG

TEST WHAT?
To the KIPs/NCES

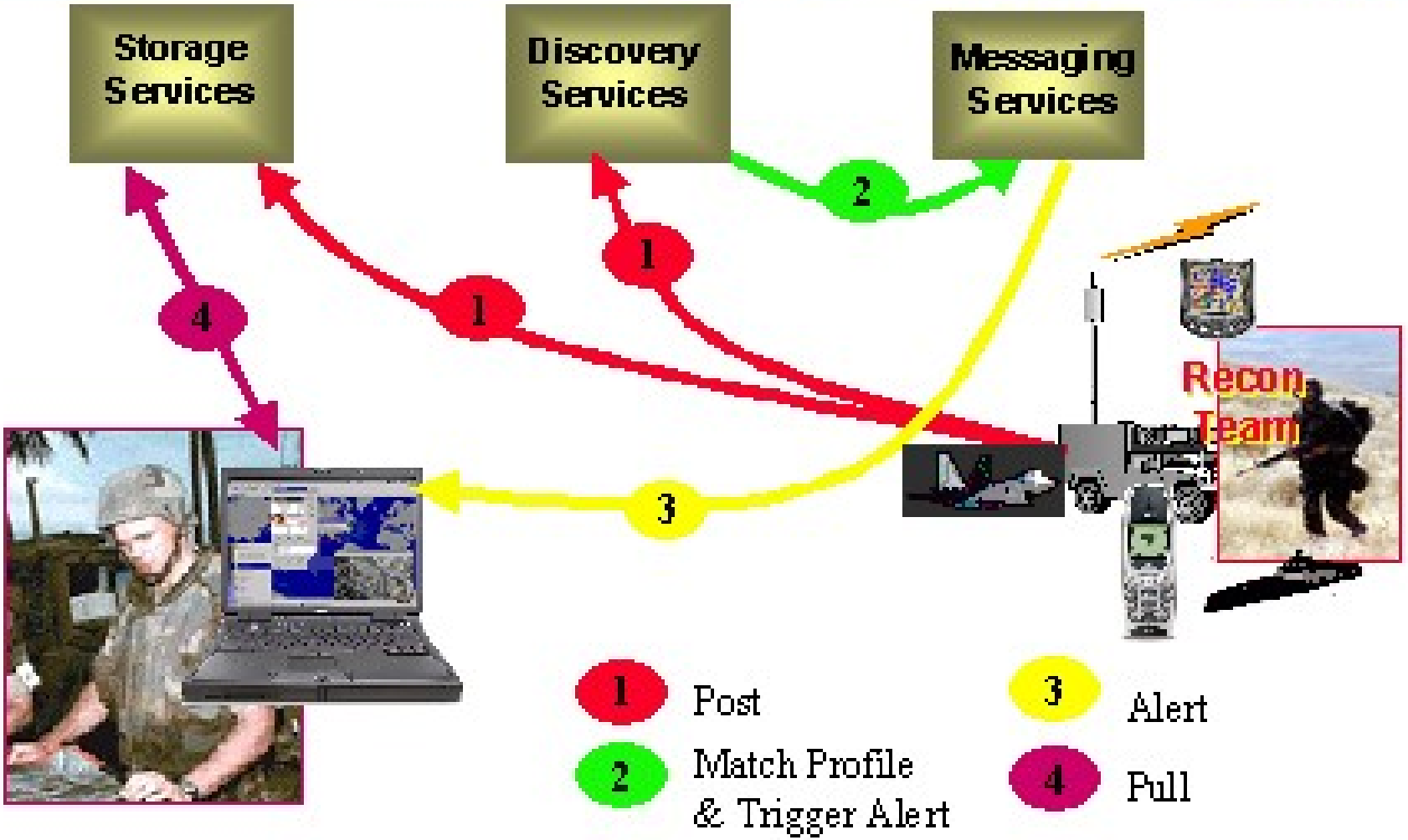


TEST WHAT?
To NCES

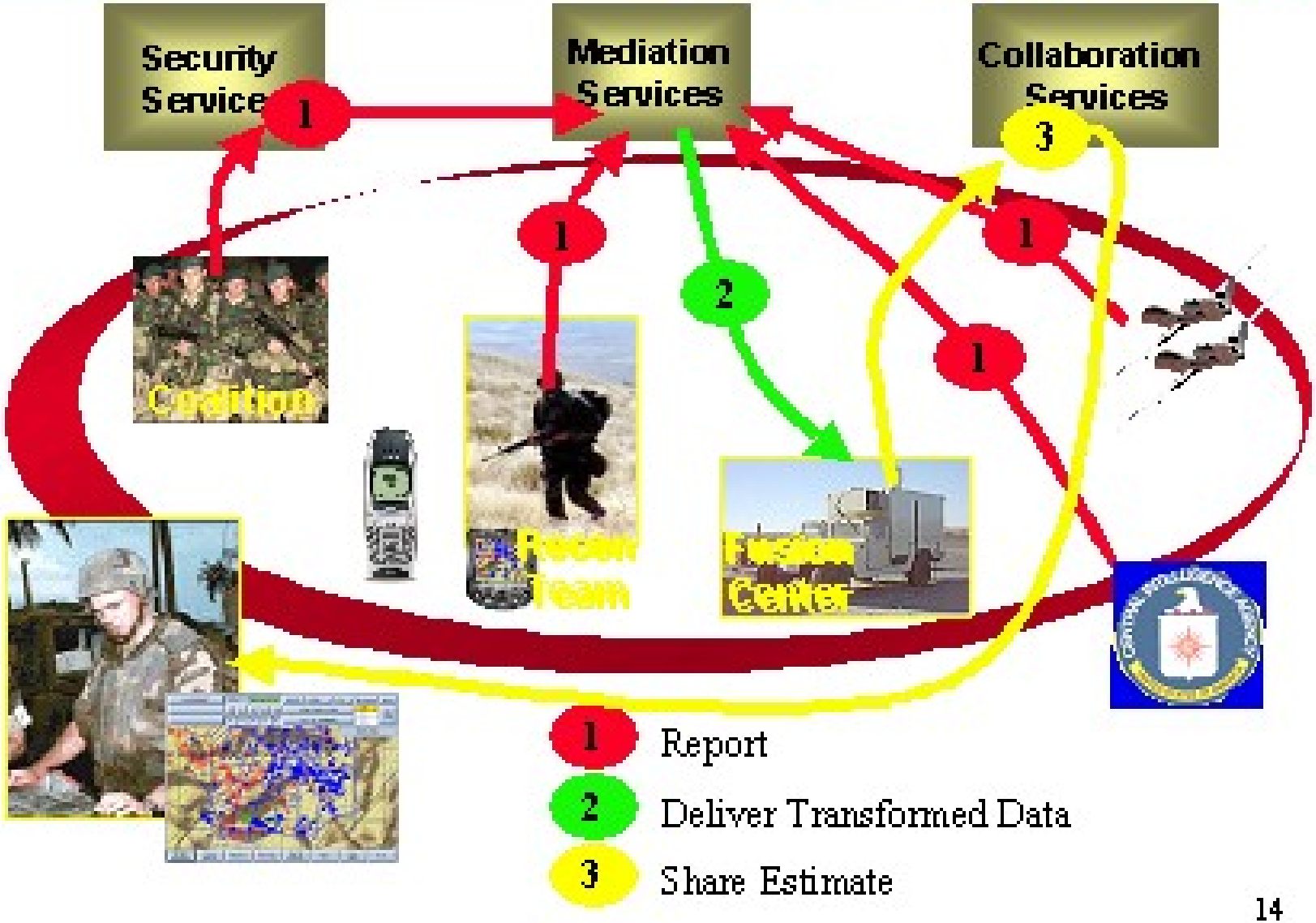


TEST WHAT?

Content, Accuracy, Timeliness, Relevance



TEST WHAT? Information needs, Information timeliness, Information assurance, Net-enabled



TEST WHAT? THE SYSTEMS

- Information Processing
- Information Transfer
- Information Modeling, Metadata, and Information Exchange
- Human-Computer Interface
- Information Security/Assurance